

software execute. When operating as an input device, the digitizer 34 senses the position of the tip of the stylus or pen 33 on the viewing screen 35 and provides this information to the computer's processor 20. In addition to the vector information, the present invention contemplates that display assemblies capable of sensing the pressure of the stylus on the screen can be used to provide further information to the CPU 20.

The preferred embodiment accepts pen strokes from the user using the stylus or pen 33 which is positioned over the digitizer 34. As the user "writes," the position of the pen 33 is sensed by the digitizer 34 via an electromagnetic field as the user writes information to the data management computer system. The digitizer 34 converts the position information to graphic data that are transferred to a graphic processing software of the data logger computer system. The data entry/display assembly of pen-based computer systems permits the user to operate the data logging computer system as an electronic notepad. For example, graphical images can be input into the pen-based computer by merely moving the stylus over the surface of the screen. As the CPU 20 senses the position and movement of the stylus, it generates a corresponding image on the screen to create the illusion that the pen or stylus is drawing the image directly upon the screen. The data on the position and movement of the stylus is also provided to a handwriting recognition software, which is stored in the ROM 21 and/or the RAM 22. The handwriting recognizer suitably converts the written instructions from the user into text data suitable for saving time and expense information. The process of converting the pen strokes into equivalent characters and/or drawing vectors using the handwriting recognizer is described below.

Preferably, the handwriting recognizer of the present invention recognizes non-cursive characters in a fixed style using a basic character set, preferably a 36-character alphanumeric character set. In addition to the basic 26 letters and 10 digits, the non-cursive

handwriting recognizer includes multi-step pen strokes that can be used for punctuation, diacritical marks, and capitalization. Preferably, the non-cursive handwriting recognizer is a software module called GRAFFITI, commercially available from Palm Computing, Inc.

Each letter in the non-cursive alphabet is a streamlined version of the standard block character -- the letter A, for example, looks like a pointy croquet hoop, and the hoop must be started at the dot indicator at the lower right corner-- as illustrated and discussed in more detail in the above incorporated-by-reference U.S. patent applications. By restricting the way the user writes, the non-cursive handwriting recognizer achieves a more perfect recognition and, as with stenography, supports an alphabet consisting of characters that can be written much more quickly than conventional ones.

The computer system is also connected to one or more input/output (I/O) ports 42 which allows the CPU 20 to communicate with other computers. Each of the I/O ports 42 may be a parallel port, a serial port, or alternatively a proprietary port to enable the computer system to dock with the host computer. In the event that the I/O port 42 is housed in a docking port 84, after docking, the I/O ports 42 and software located on a host computer 82 support an automatic synchronization of data between the computer system and the host computer. During operation, the synchronization software runs in the background mode on the host computer 82 and listens for a synchronization request or command from the computer system 10 of the present invention. Changes made on the computer system and the host computer will be reflected on both systems after synchronization. Preferably, the synchronization software only synchronizes the portions of the files that have been modified to reduce the updating times.

The I/O port 42 is preferably a high speed serial port such as an RS-232 port, a Universal Serial Bus, or a Fibre Channel for cost reasons, but can also be a parallel port for

higher data transfer rate. Preferably, the I/O port 42 has a housing which is adapted to snappably connect to the housing of a Musical Instrument Digital Interface (MIDI) player 37, a fax modem 40, a voice recorder 43, a GPS receiver 46 and a barcode reader 48. When the I/O port 42 is connects to the MIDI player 37, the computer system 10 drives high quality audio speakers 38 and 39 which connect to the MIDI player 37 to support multimedia applications on the computer 10.

Additionally, via the serial port 42, a fax-modem 40 is adapted to receive information over a telephone 41 via a plain old telephone system (POTS) landline or over the radio frequencies and allow the user to access information untethered. Further, the modem 40 may serve as part of a wide-area-network to allow the user to access additional information. The fax-modem 40 can receive drawings and text annotations from the user and send the information over a transmission medium such as the telephone network or the wireless network to transmit the drawings/text to another modem or facsimile receiver, allowing the user to transmit information to the remote site on demand. The fax-modem 40 can be implemented in hardware or in software with a few additional components such as a DAA, as is known in the art.

The case is a rectangular plastic casing with a major opening on the top of the case to receive the LCD panel 35 and the digitizer 34. The case has a receptacle which is adapted to receive and store the pen 33. Furthermore, a plurality of push-buttons in the keypad 24 are positioned on the top side of the case. The push-buttons of the keypad 24 preferably allows the user to invoke one or more pre-installed software on the handheld computer. Additionally, the case has an opening on the backside which is adapted to receive a connector carrying the electrical impulses to and from the I/O port 42.